

The Association Between Extreme Weather Experiences and Belief in Global Warming



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Introduction

- Climate change, the long-term change in average weather patterns, is not usually noticeable, while global warming, the increase in the average temperature of Earth, is more noticeable. (Global Warming vs. Climate Change)
- Though indicators like rising temperatures and unusual weather occurrences for the season might be noticed as they occur, a sustained or increasingly common event will often be ignored or written off as non-concerning and therefore not impact an individual's view on climate change or global warming (Hughes et al., 2020; Marlon et al., 2019).

Methods

Sample

- Adults (age 18 or older) in the United States, not including Washington DC, surveyed by telephone calls (n=929) from the Fall 2017 National Surveys on Energy and Environment (NSEE).
- Secondary data set, "Billion-Dollar Weather and Climate Disasters," weather disasters in the United States from 2007 to 2016 that reached or exceeded \$1 billion in damages/costs. (n=798) 92 weather events in total, 789 weather event were reported as some impacted multiple states.

- Some research suggests association of climate change to extreme weather changes is dependent on a prior understanding of, and belief in, climate change (Sambrook et al., 2021).
- Belief or disbelief in climate change is unlikely to be attributable to a singular cause, but by examining the extremes (i.e., extreme weather events) a better understanding of what must physically happen for someone to believe in climate change could be gained.

Measures

- Belief in global warming was indicated by a binary yes or no.
- Confidence in belief or disbelief of global warming was measured on a scale of not confident at all to very confident.
- The perception of global warming's impact was measured on a scale of strongly disagree to strongly agree.
- Weather events recorded were drought, flooding, severe storm, tropical cyclone, wildfire, and winter storm and added to create a sum per state.

Research Questions

Does experiencing extreme weather occurrences affect belief in global warming?

Is belief in global warming affected by perceived impacts of global warming?



Multivariate (cont.)

When preforming multivariate analysis with all

- Of those that answered the question, 24% did not believe in global warming and 76% did believe in global warming.
- 18% of respondents from Northeast, 38% from South, 22% from Midwest, 22% from West.
- 67% very confident in belief in global warming; 54% very confident in non-belief in global warming.

Bivariate

- Both the number of extreme weather events and the region of the respondent were not significantly associated with belief in global warming.
- Chi-Square analysis showed that global warming belief was significantly associated with perceived impact of global warming. Those that believed in global warming (81.83%) were significantly more likely to agree that global warming impacted their state than those who did not (16.76%). $(X^2=271.66)$, 3 df, p<.0001)
- Chi-Square analysis showed that global warming



Level by Perceived Impact of Global Warming

Multivariate (cont.)

The confidence level in terms of agreement with the impact of global warming depends on belief in global warming. Strong agreement is associated with believers while strong disagreement is associated with non-believers (Fig 1).



weather types, both severe storm and winter storm were significantly associated with belief in global warming. Severe storm was negatively associated, and winter storm was positively associated.

Discussion

- This study did not look at political party or affiliation, which is likely to have had an impact on their belief in global warming and confidence in their global warming beliefs.
- Some weather events do not happen throughout the US. Even with global warming causing temperatures to change, certain events won't happen in certain areas, which makes it difficult to determine if a nonuniversal weather event affects belief in global warming throughout the United States.
- Further research is needed to determine whether belief in global warming can be

belief was significantly associated with confidence in belief or non-belief. Those that believed in climate change were significantly more likely to report higher confidence levels in their belief (95.98%) than those that did not (84.88%). (X²=31.368, 2 df, p<.001)

Multivariate

- Confidence in belief or non-belief in global warming and perceived impact of global warming were both associated with belief in global warming after controlling for confounders and moderators.
- Strong agreement that global warming has impacted the respondent's state suggests they are 107.03 times likelier to believe in climate change than if they only strongly disagree that global warming has impacted their state.
- For both believers and non-believers, the highest levels of confidence in their belief are associated with the highest number of storms. Medium confidence levels are associated with the second most storms, and low confidence levels are associated with experiencing the least number of storms (Fig 2).

linked to other visible signs, for example crop growth or seasonality changes, for example a milder winter than normal.

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